

## FLASH DEVICE

### DESCRIPTION

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#### BACKGROUND OF THE INVENTION

##### *Field of the Invention*

10           The present invention relates to a built-in flash  
mechanism that can be implemented in a digital camera,  
a conventional camera or other video devices. By the  
elasticity of the spring and the discharge of the  
electromagnetic valve, this invention can flick the flash  
15           up when the illumination is insufficient or it is manually  
switched on. With this method, a power-save, easy-to-use,  
and simple flash pop-up mechanism can be achieved.

##### *Background Description*

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          There are at least four types of flashlights utilized  
in cameras. They are hand-held, top-attachable, built-in  
and standalone flashlight devices. Among all types of  
flash units, built-in flashes are popular in both digital  
25           and conventional cameras. For built-in flashes, there  
are two types available: fixed and pop-up flashes. The  
present invention is a built-in pop-up flash, which will  
pop up manually, or pop-up when insufficient illumination  
is detected.

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          In addition, the existing built-in pop-up flash unit  
utilizes a two-way electromagnetic valve, which has

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drawbacks, such as complicated structure and large force  
needed to hold the flash inside the camera housing or  
to pop up the flash, requiring larger activation force.  
Besides, the current of the two-way electromagnetic valve  
5 is larger, thus consuming the precious battery power.

To surmount the drawbacks aforementioned, the  
present invention utilizes assembly of a one-way  
electromagnetic valve, auto illumination detection, and  
10 elasticity of the spring to constitute a  
small-force-needed, easy-to-use and simple structure.

#### SUMMARY OF THE INVENTION

15 It is therefore an object of the present invention  
to provide a small-force-needed, easy-to-use and simple  
structure flash device.

The present invention provides a built-in auto  
20 pop-up flash mechanism which comprises: a built-in flash;  
a one-way electromagnetic valve; a spring that will switch  
the flash on when there is no magnetic force from the  
electromagnetic valve; a shaft with two ends, where a  
first end is connected to the spring and react to the  
25 motion of the spring and a second end is a clip used to  
withhold the flash; a buckle clipped by the clip when  
the flash is shut; and a pusher used to push the shaft  
pivotally when the flash is being pressed to shut.

30 It is another aspect of the present invention to  
provide a built-in flash that can automatically pop-up  
when insufficient illumination is detected;

It is yet another aspect of the present invention to provide the built-in flash being able to pop up manually;

5 It is yet further aspect of the present invention that the electromagnetic valve is a one-way electromagnetic valve. And the force of the one-way electromagnetic valve is smaller than the force of a two-way electromagnetic valve, and the one-way electromagnetic valve is normal close by magnetic force.  
10 Moreover, an external force is needed to drive the iron core of the electromagnetic valve.

Furthermore, the elasticity of the spring is between the holding force and the release force of the  
15 electromagnetic valve. And the elasticity is the force that drives the iron core of the electromagnetic valve outwards.

Particularly, the gap between the shaft and the  
20 pusher is needed when the flash is shut.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

25 The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

Figure 1 shows the schematic appearance view of the  
30 built-in flash device in an open status;

Figure 2 shows the cross-sectional view of the flash device in an open status;

Figure 3 shows the schematic appearance view of the flash device in a close status; and

5           Figure 4 shows the cross-sectional view of the embodiment of the flash device which is in a close status.

The list of each elements and its numbering:

- 10       1: a flash  
         2: an electromagnetic valve  
         3: a spring  
         4: a shaft  
         5: a clip  
15       6: a pusher  
         7: a buckle  
         8: a salient  
         9: a gap

20                   **DETAILED DESCRIPTION OF A PREFERRED  
                      EMBODIMENT OF THE INVENTION**

          The following is a description of the present invention. However, other than the detailed description,  
25       the present can also be widely implemented in other embodiment, and the scope of the present invention is not limited and is based on the future patent scope.

          The present invention is illustrated in figure 2,  
30       which is the illustration of the embodiment when the flash is open. From this figure, the present invention comprises includes a flash 1, a electromagnetic valve 2, a spring 3 which pops the flash 1 up when the electromagnetic valve

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2 is discharged, a shaft 4 which is connected to the spring 3 and react to the motion of spring 3, a clip 5 which is connected to the shaft 4 and will release a buckle 7 of the flash 1 when the spring 3 drives the iron core of the electromagnetic valve outwards, and a pusher 6 which, at this stage, releases a salient 8 in shaft 4.

According to this, we can see that, when the electromagnetic valve 2 is discharged because there is either a manual instruction or insufficient illumination detected, the spring will push the iron core outwards, make the shaft 4 rotate and then the clip 5 will release buckle 7. At the same time, the pusher 6 will also release the salient 8 and the flash 1 will pop up and open.

The present invention is also illustrated in figure 2, which is the illustration of the embodiment when the flash is close. When the flash 1 is manually pressed, the pusher 6 will push the salient 8 down, make the shaft 4 rotate and the clip 5 will clip buckle 7. At the same time, the iron core will be attracted by the charged electromagnetic valve 2. There is one thing has to be noted, that is when the flash 1 is close, there should be a gap between the pusher 6 and the salient 8, or the flash 1 won't be able to pop up again.

Particularly, the electromagnetic valve is a one-way electromagnetic valve. And the force of the one-way electromagnetic valve is smaller than the force of a two-way electromagnetic valve, and the one-way electromagnetic valve is normal close by magnetic force. Moreover, an external force is needed to drive the iron core of the electromagnetic valve. Furthermore, the

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elasticity of the spring is between the holding force  
and the release force of the electromagnetic valve. And  
the elasticity is the force that drives the iron core  
of the electromagnetic valve outwards. Moreover, the gap  
5 between the shaft and the pusher is needed when the flash  
is shut. The force of the one-way electromagnetic valve  
is smaller than force of a two-way electromagnetic valve,  
and the one-way electromagnetic valve is placed at a normal  
close position by magnetic force. An external force is  
10 needed to drive the iron core of the electromagnetic valve.

Although preferred embodiments of the present  
invention have been described in the forgoing description  
and illustrated in the accompanying drawings, it will  
be understood that the invention is not limited to the  
embodiments disclosed, but is capable of numerous  
rearrangements, modifications, and substituting of parts  
and elements without departing from the spirit and scope  
of the invention. Accordingly, the present invention is  
intended to encompass such rearrangements, modifications,  
and substitutions of parts and elements as fall within  
the scope of the appended claims.